Small Business Innovation Research/Small Business Tech Transfer

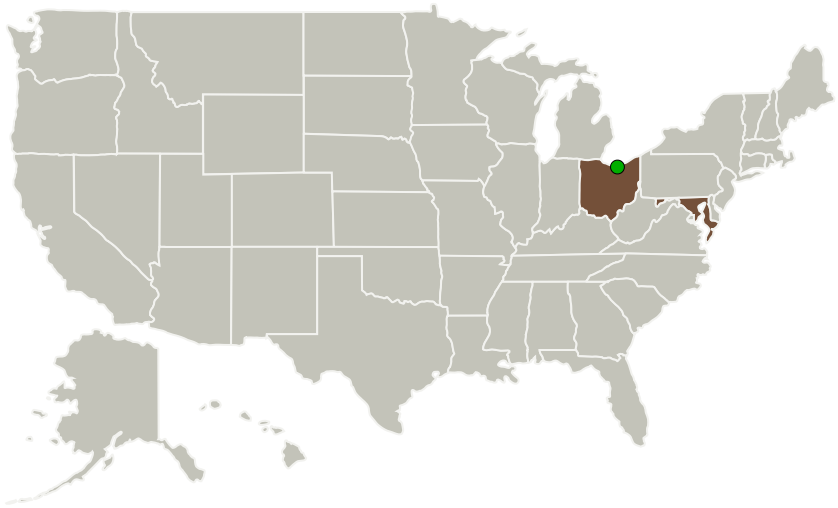
ESPRIT: Exercise Sensing and Pose Recovery Inference Tool, Phase II

Completed Technology Project (2012 - 2015)

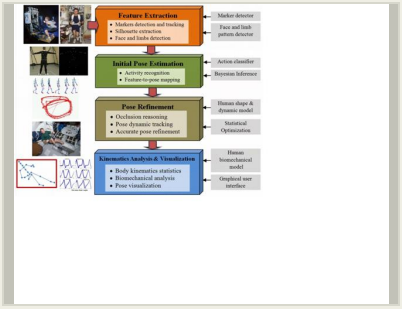
Project Introduction

Crew exercise is important for maintaining the health and fitness of astronauts, and to prevent adverse health problems, such as bone density losses. We developed algorithms for ESPRIT: an Exercise Sensing and Pose Recovery Inference Tool, in support of NASA's Exercise Countermeasure Program. ESPRIT is a stereo camera system that monitors exercise activities, detects markers placed on the body and other image features and recovers 3D kinematic body pose. ESPRIT relies on strong prior knowledge and modeling of human body, pose, dynamics, and appearance. It also relies on advanced statistical inference techniques to achieve robust and accurate motion capture. Phase I result has been promising and has demonstrated motion capture of several exercises, including walking, curling and dead lifting. Phase II effort will focus on enhancement of algorithms, development of an ESPRIT prototype, detailed performance evaluation, and delivery of prototype for testing and demonstration.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Intelligent Automation, Inc.	Lead Organization	Industry	Rockville, Maryland
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



ESPRIT: Exercise Sensing and Pose Recovery Inference Tool Project Image

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Primary U.S. Work Locations	
Maryland	Ohio

Project Transitions

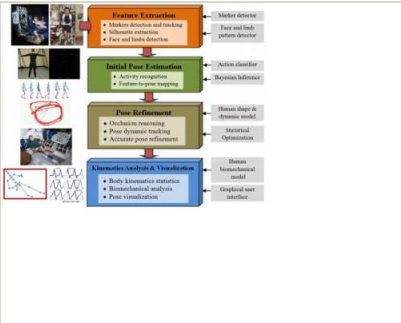
June 2012: Project Start

February 2015: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138062)*

Images



Project Image
ESPRIT: Exercise Sensing and Pose Recovery Inference Tool Project Image
(https://techport.nasa.gov/image/130066)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Intelligent Automation, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

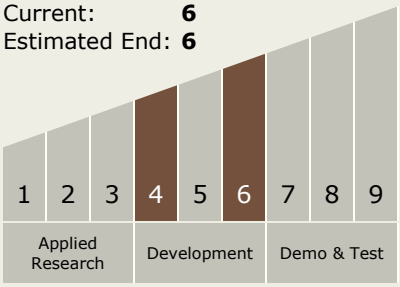
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Mun Wai Lee

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.2 Prevention and Countermeasures

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System